VOL. 04 NO. 05 July/August 1998

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Medical Surveillance Monthly Report

Table of Contents

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Case Reports

Late Presentations of Vivax Malaria of Korean Origin, Multiple Geographic Sites

Since 15 June 1998, eleven cases of vivax malaria have been reported among soldiers from ten different locations in the United States and one in Europe (figure 1). Each case was associated with military training in the Republic of Korea during the summer of 1997. The cases emphasize the importance of vigilance among medical care providers Army wide for late presentations of vivax malaria of Korean origin. The following reports describe presentations and clinical courses of four recent cases.

Case 1:

On the evening of 15 June 1998, a 20 year old white male military policeman presented to the Guthrie Army Medical Clinic, Fort Drum, New York, with chills and fever (102.7° F.) of several hours duration. He was presumptively diagnosed with a viral illness and was discharged to his barracks with ibuprofen and acetaminophen. The following afternoon, he developed chills and shivering, and he returned to the clinic where his temperature was 105.0° F. He was treated with intravenous fluids, ibuprofen, and acetaminophen, and after approximately 6 hours of observation, he was discharged to his barracks on antipyretic medications.

For the next four days, he remained in his barracks with malaise and fatigue. On the following day, he reported to sick call with cold chills and fever and was admitted to the local civilian hospital. During examination of his blood to determine the white blood cell differential count, red cells parasitized with trophozoites of *Plasmodium vivax* were identified. The patient was diagnosed with vivax malaria and begun on standard therapy with chloroquine. After beginning treatment, his clinical status rapidly improved, and after three days in the hospital, he was discharged to light duty on primaquine (15 mg. daily for 14 days).

The patient is a New York state native with no significant prior illnesses or foreign travel history. He entered the Army in 1996, and his first duty assignment after training was in Korea. While there, he participated in approximately four short field exercises (e.g., weapons firing), including one at Warrior Base (located north of the Imjin River within a few kilometers of the Demilitarized Zone) in August 1997. He recalled that at Warrior Base the mosquitoes were so numerous that they kept him awake most of one night. He left Korea in November 1997 and was assigned to Fort Drum.

In February 1998 (during the dry season in Panama), the patient participated in a four week exercise at the Jungle Operations Training Center (JOTC) at Fort Sherman, Panama. While in the field, he slept on the ground, generally on a

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poncho, covered with a bed net — sleeping bags, cots, and bed net poles were not available. At intervals up to six hours duration, he applied military-issue DEET lotion and sun block to his skin. He did not recall using permethrin on his uniforms, and since malaria was not considered a threat at the JOTC, chemoprophylaxis was not provided. He received few mosquito bites during the jungle training but recalled numerous insect bite marks around his ankles. Other than a brief (several hours) episode of chills, sweating, abdominal cramps, and diarrhea, he remained well throughout the exercise.

The patient denied travel outside of New York state after he returned to Fort Drum in March 1998. No other cases of malaria were reported among Fort Drum soldiers between February and June of 1998.

Case 2:

A 23 year-old white-hispanic male infantryman from the US Army's Eagle Base in Bosnia presented to the 67th Combat Support Hospital (CSH) (Forward) on the evening of 29 July 1998 with fever (104.2°F), chills, headache, sweats, and general malaise. He had a four-day history of fatigue, weakness, mild retro-orbital pain, myalgias, headache, fever, chills, anorexia, and nausea. He had been diagnosed with a viral syndrome by his unit's medics and treated with aspirin, acetaminophen, and ibuprofen without relief.

At the 67th CSH, an internal medicine physician requested that smears of the patient's blood be examined for malaria. Red cells parasitized with trophozoites of *Plasmodium vivax* were identified. The patient was diagnosed with vivax malaria and begun on therapy with chloroquine and primaquine.

Continued on page 8

Geographic distribution of cases of *P. vivax* malaria of Korean origin (presumed), US Army, 15 June - 15 August 1998

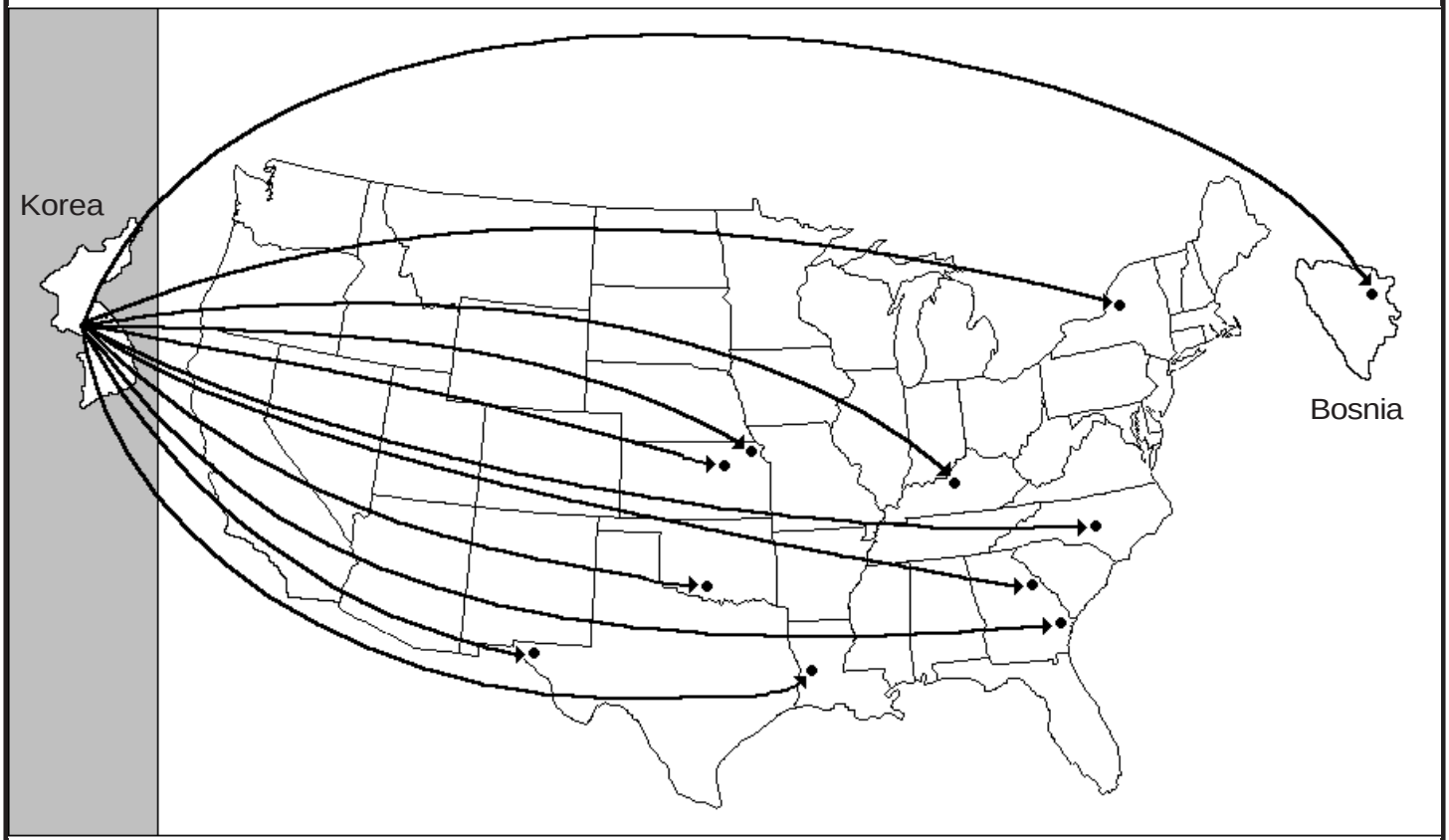


TABLE I. Selected sentinel reportable diseases, US Army medical treatment facilities*
July, 1998

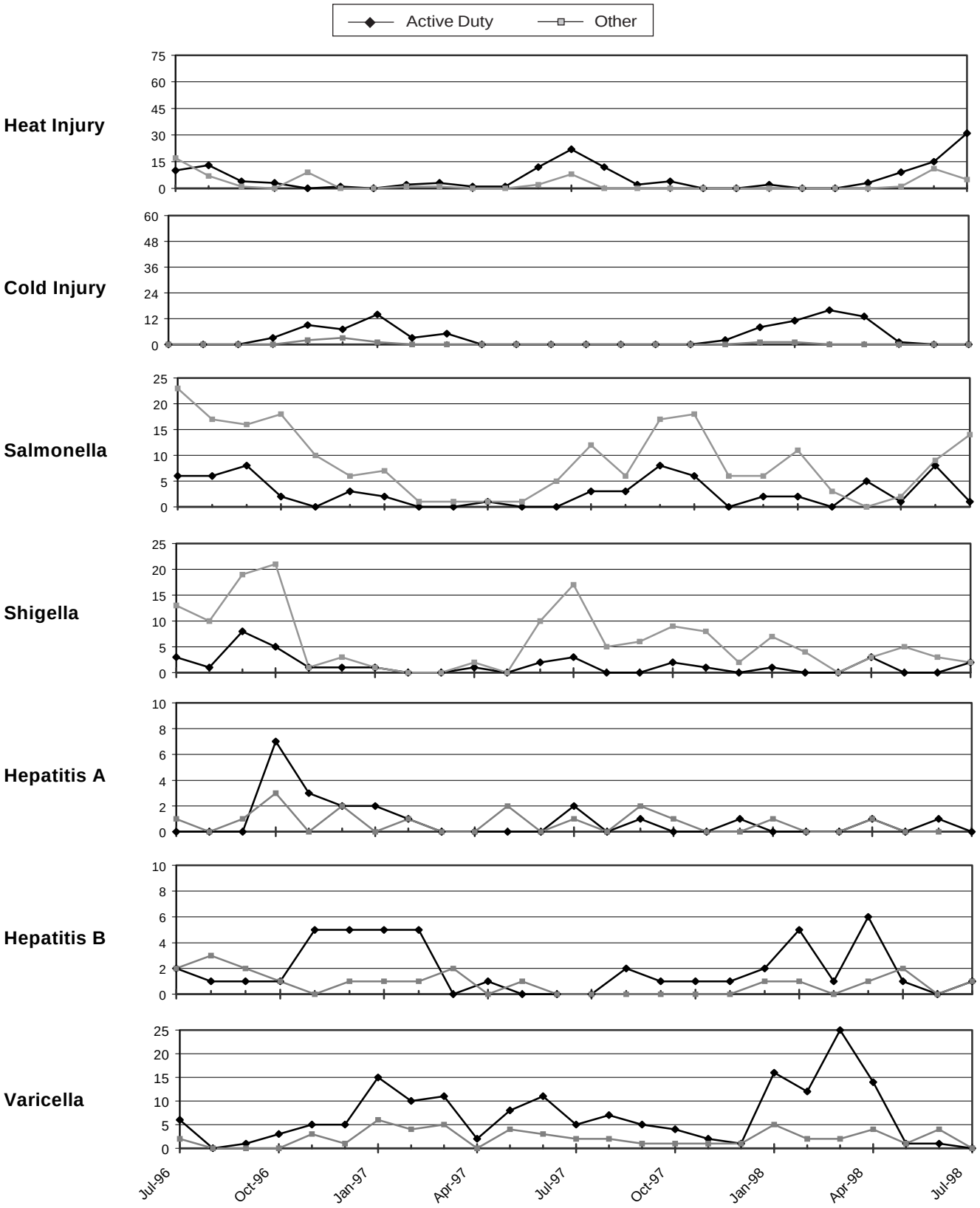
Reporting MTF/Post**	Total number of reports submitted July 1998	Environmental Injuries		Viral Hepatitis		Salmonellosis		Shigella		Varicella	
		Active Duty				Active Duty	Other	Active Duty	Other	Active Duty	Other Adult
		Heat	Cold	A	B						
		Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998
NORTH ATLANTIC RMC											
Walter Reed AMC	32	0	0	2	0	1	2	0	0	4	0
Aberdeen Prov. Ground, MD	5	1	0	0	1	0	0	0	0	0	0
FT Belvoir, VA	20	0	0	0	0	0	9	0	1	1	0
FT Bragg, NC	22	16	1	0	0	12	12	2	15	0	0
FT Drum, NY	17	0	14	0	2	0	0	0	0	2	4
FT Eustis, VA	29	8	0	0	0	0	1	1	3	5	2
FT Knox, KY	19	4	0	0	0	0	0	0	0	18	0
FT Lee, VA	6	0	0	0	2	0	0	0	0	0	0
FT Meade, MD	30	0	0	0	0	0	1	0	0	3	0
West Point, NY	8	0	0	1	1	0	0	0	0	0	1
GREAT PLAINS RMC											
Brooke AMC	41	1	0	4	2	1	4	0	1	2	0
Beaumont AMC	21	0	0	0	0	0	3	0	2	7	1
FT Carson, CO	59	4	2	0	0	1	2	0	0	3	0
FT Hood, TX	122	3	0	0	8	0	0	1	2	2	1
FT Huachuca, AZ	0	0	0	0	0	0	1	0	0	0	0
FT Leavenworth, KS	1	0	0	0	0	0	1	0	0	0	0
FT Leonard Wood, MO	30	1	1	0	0	1	0	0	0	14	7
FT Polk, LA	38	1	0	0	0	0	0	0	0	0	0
FT Riley, KS	47	0	1	0	0	1	0	1	0	3	0
FT Sill, OK	0	6	0	0	7	0	0	0	0	0	0
SOUTHEAST RMC											
Eisenhower AMC	78	0	0	0	1	0	0	0	0	0	0
FT Benning, GA	0	12	1	0	1	1	1	0	3	2	0
FT Campbell, KY	51	1	1	0	0	0	3	1	1	1	3
FT Jackson, SC	16	3	1	2	0	0	1	0	1	5	0
FT McClellan, AL	6	6	0	0	0	0	0	0	0	0	0
FT Rucker, AL	15	0	0	0	0	0	0	0	0	0	0
FT Stewart, GA	70	23	1	0	0	0	0	0	1	3	0
WESTERN RMC											
Madigan AMC	0	0	0	0	0	0	3	0	0	3	0
FT Irwin, CA	5	0	0	0	2	0	0	0	0	0	0
FT Wainwright, AK	0	0	9	0	0	0	0	0	0	0	0
OTHER LOCATIONS											
Tripler	76	1	0	1	0	0	4	0	0	0	0
Europe	105	1	22	2	17	16	17	0	0	6	4
Korea	0	0	0	1	3	0	0	0	0	1	0
Total	**969**	**92**	**54**	**13**	**47**	**34**	**65**	**6**	**30**	**85**	**23**

* Based on date of onset.

** Reports are included from main and satellite clinics. Not all sites reporting.

Date of Report: 7-Aug-98

FIGURE I. Selected sentinel reportable diseases, US Army medical treatment facilities*
Cases per month, Aug 96 - July 98



* Reports are included from main and satellite clinics. Not all sites reporting.

Date of report: 7-Aug-98

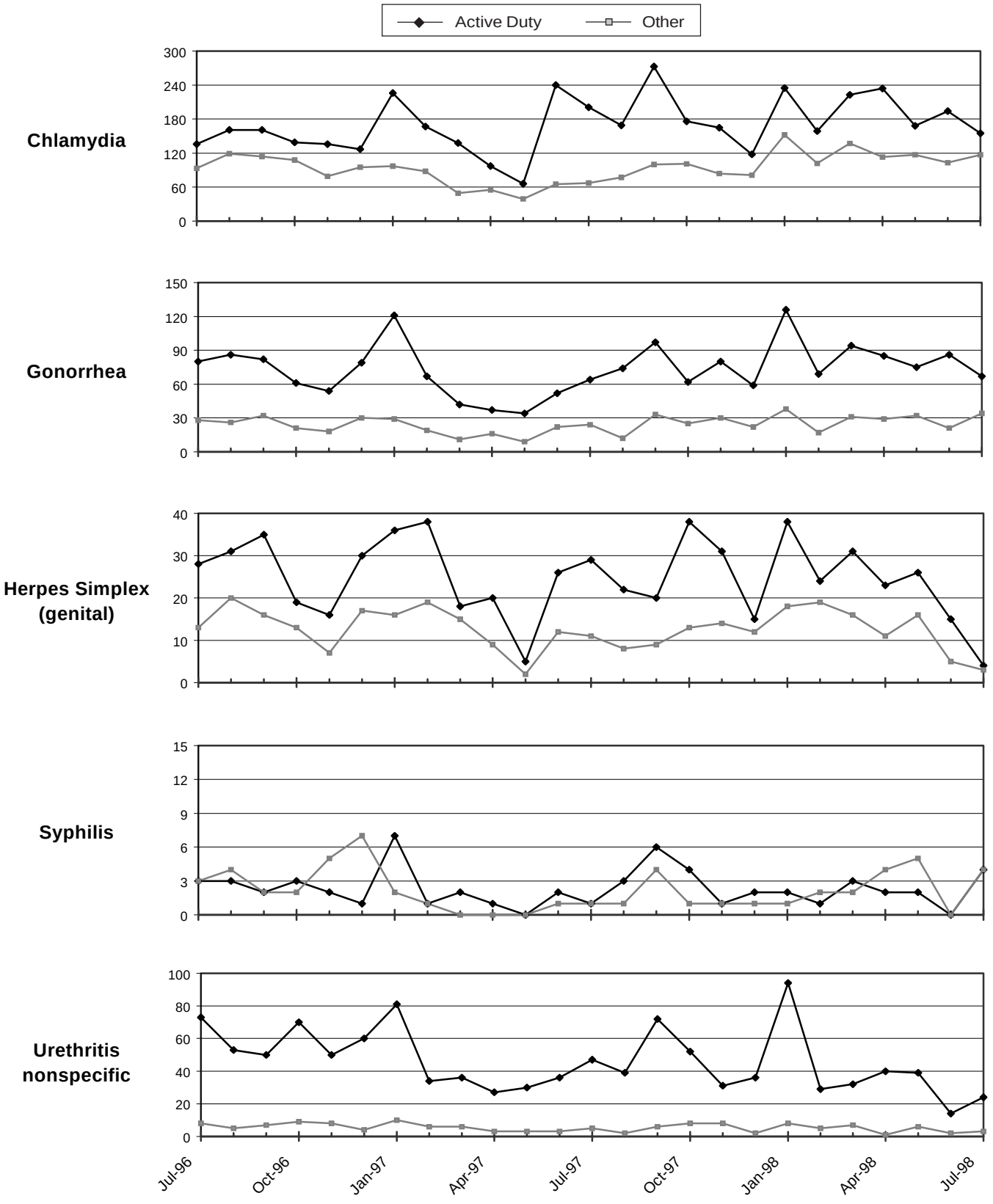
TABLE II. Reportable sexually transmitted diseases, US Army medical treatment facilities* July, 1998

Reporting MTF/Post**	Chlamydia		Urethritis non-spec.		Gonorrhea		Herpes Simplex		Syphilis Prim/Sec		Syphilis Latent		Other STDs**	
	Cur. Month	Cum. 1998	Cur. Month	Cum. 1998	Cur. Month	Cum. 1998	Cur. Month	Cum. 1998	Cur. Month	Cum. 1998	Cur. Month	Cum. 1998	Cur. Month	Cum. 1998
NORTH ATLANTIC RMC														
Walter Reed AMC	3	39	1	8	6	19	0	10	0	0	0	2	0	2
Aberdeen Prov. Ground, MD	4	18	1	2	0	1	0	1	0	0	0	0	0	0
FT Belvoir, VA	7	99	0	0	4	30	1	27	4	4	0	0	1	12
FT Bragg, NC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FT Drum, NY	6	65	1	4	8	27	0	9	0	1	0	1	0	0
FT Eustis, VA	14	72	0	0	4	29	0	0	0	0	0	1	0	0
FT Knox, KY	15	108	0	0	2	39	0	28	0	0	0	1	0	0
FT Lee, VA	0	20	0	0	0	15	0	0	2	2	0	0	0	0
FT Meade, MD	0	40	2	33	0	5	0	25	0	2	0	0	0	0
West Point, NY	2	12	0	0	1	4	0	4	0	0	0	0	0	0
GREAT PLAINS RMC														
Brooke AMC	17	112	0	0	5	30	0	1	0	1	0	0	0	0
Beaumont AMC	12	161	0	0	1	50	0	18	0	1	0	2	0	0
FT Carson, CO	22	253	6	87	5	53	0	18	0	1	0	0	0	0
FT Hood, TX	9	542	3	131	3	263	0	49	0	2	0	0	0	3
FT Huachuca, AZ	1	9	0	0	0	3	0	0	0	0	0	0	0	0
FT Leavenworth, KS	0	16	0	0	0	1	0	0	0	0	0	0	0	0
FT Leonard Wood, MO	6	62	1	19	7	26	0	0	0	0	0	0	0	1
FT Polk, LA	6	43	0	0	2	11	0	1	0	0	0	0	0	0
FT Riley, KS	28	151	0	0	7	47	0	1	1	1	0	0	0	0
FT Sill, OK	11	85	1	21	5	63	0	7	0	0	0	0	0	3
SOUTHEAST RMC														
Eisenhower AMC	21	144	0	0	4	16	0	22	0	0	0	0	0	0
FT Benning, GA	0	114	0	3	0	42	0	15	0	0	0	0	0	0
FT Campbell, KY	32	257	0	0	10	94	0	9	0	1	0	1	0	0
FT Jackson, SC	0	105	0	0	0	40	0	3	0	0	0	0	0	5
FT McClellan, AL	3	5	0	0	0	2	0	0	0	0	0	0	0	0
FT Rucker, AL	0	22	0	0	0	5	0	3	0	0	0	0	0	0
FT Stewart, GA	4	82	11	109	13	69	4	46	0	0	0	2	0	0
WESTERN RMC														
Madigan AMC	0	153	0	63	0	20	0	13	0	0	0	0	0	0
FT Irwin, CA	1	24	0	0	0	3	0	0	0	0	0	0	0	0
FT Wainwright, AK	0	32	0	0	0	2	0	2	0	0	0	0	0	0
OTHER LOCATIONS														
Tripler	42	174	0	0	13	52	2	49	0	0	0	0	0	0
Europe	4	415	0	0	3	77	0	22	0	6	0	1	0	4
Korea	0	21	0	0	0	11	0	2	0	0	0	0	0	0
Total	**270**	**3455**	**27**	**480**	**103**	**1149**	**7**	**385**	**7**	**22**	**0**	**11**	**1**	**30**

* Reports are included from main and satellite clinics. Not all sites reporting. Date of Report: 7-Aug-98

** Other STDs: (a) Chancroid (b) Granuloma Inguinale (c) Lymphogranuloma Venereum (d) Syphilis unspec. (e) Syph, tertiary (f) Syph, congenital

FIGURE II. Reportable sexually transmitted diseases, US Army medical treatment facilities*
Cases per month, Aug 96 - July 98



* Reports are included from main and satellite clinics. Not all sites reporting.

Date of report: 7-Aug-98

Continued from page 3

He responded to the treatment within 72 hours.

The patient was assigned to Fort Drum, New York, in February 1998. He deployed to Eagle Base in Bosnia in mid-July 1998. All his prior foreign travel was performed with the Army. He was in Islamabad, Pakistan, for 30 days in September 1995, trained for three weeks at the Jungle Operations Training Center (JOTC) in Panama in February 1995, and was assigned to Camp Casey, Korea, from February 1997 through February 1998.

In Korea, he spent approximately four months during the spring and summer of 1997 training at Warrior Base. Mosquitoes there were numerous. He used commercial brands of insect repellents, did not use permethrin on his uniforms, and slept on a cot without a bednet. He stated that permethrin and bednets were not provided through his unit's supply system.

Case 3:

On 7 August 1998, a 21 year old Hispanic male Army active duty private first class presented to sick call at Fort Sill, Oklahoma with episodic fevers, chills, night sweats, headaches, nausea, emesis, and anorexia. Episodes had occurred during three nights at approximately 0100 to 0300 hours. The patient also reported mild headaches, light headedness, fatigue, and anorexia of two to four weeks duration. Despite frequent headaches, he had continued his normal duties. He presented to sick call on this day because his symptoms seemed to be worsening. He was referred to the hospital for evaluation.

In the emergency room, his heart rate was 106 beats per minute and his temperature was 103° F. rectal. He was slightly drowsy and had mild icterus without liver or spleen enlargement. Initial laboratory assessment revealed elevated total bilirubin (3.84 mg/dl), elevated LDH (314 u/l), and slightly elevated AST (45 u/l). He had thrombocytopenia (platelets: 20,000), leukopenia (WBC: 2,400), and a normal hematocrit (40.3). His WBC differential was remarkable for 1% myelocytes, 2% metamyelocytes, 61% bands, 7% segmented neutrophils, 24% lymphocytes, 2% monocytes, and 3% eosinophils. There was evidence of mild coagulopathy with elevated PT (13.4, normal range: 10-12.5), normal APTT, and decreased fibrinogen (132, normal range: 175-425). Fibrin degradation products were negative.

Initially, the patient was considered a heat casualty with disseminated intravascular coagulation (DIC). In the laboratory, however, ringed trophozoites and gametocytes of *Plasmodium vivax* were observed during examination of a peripheral blood smear. The parasitemia level was estimated as <1%. After consultation with the infectious disease service at Brooke Army Medical Center, the patient was treated with chloroquine and primaquine – and he rapidly responded. He was also treated initially with platelets and FFP, and within a few days, his platelet count had returned to normal.

The soldier was stationed at Camp Casey in Korea from March 1997 through March 1998. While in Korea, he often participated in field operations north of Camp Casey near the DMZ. These operations lasted 1-2 weeks and occurred approximately every two months. In the field, he generally slept in a military vehicle. He reported that he was frequently "eaten up" by mosquitoes at Camp Casey as well as in the field. He did not receive malaria chemoprophylaxis and did not recall specific warnings or training regarding malaria.

Case 4:

On 1 August 1998, at the insistence of his wife, a US Army sergeant stationed at Fort Polk, Louisiana, presented to the emergency room at Bayne-Jones Army Community Hospital complaining of fever, malaise, headaches, night sweats, and nonproductive cough. For approximately the previous ten days while on leave, the soldier had experienced nighttime episodes of fever (to 103°F.), sweating, and extreme fatigue that persisted to the morning. Initial laboratory evaluation

revealed pancytopenia with a platelet count of 56,000. He was admitted for further evaluation and treatment.

The patient's physical examination was remarkable for an enlarged spleen, and following his admission, petechiae developed on his palate. Thick and thin blood smears were examined and reported as negative. A hematologist was consulted, a bone marrow biopsy was conducted, and results were reported as normal. The thick and thin blood smears were reexamined, and *Plasmodium* parasites were observed. The patient was begun on chloroquine and primaquine, and within three days, he was feeling better, his fevers had resolved, and he was discharged to his home.

The patient was assigned to Korea from December 1996 to November 1997. In Korea, he was stationed at Camp LaGuardia (in the vicinity of Camp Red Cloud). He rarely if ever used barrier protection (e.g., bednets) against mosquitoes. He recalled numerous mosquito bites while operating in the field.

Editorial comment: Post-cold war US defense strategy demands mobile military forces capable of deploying rapidly and often worldwide. Thus, while the Army is significantly smaller than during the cold war, it now conducts more overseas operations;[1] and as soldiers deploy more often, they are exposed to a greater number and a broader diversity of indigenous medical threats. Military medical decisions regarding preventive interventions (e.g., chemoprophylaxis), diagnostic evaluations (e.g. differential diagnoses), and treatments (e.g., antibiotic resistance) inherently depend on knowledge of locations and characteristics of health-threatening, deployment-related activities. In times of high operations tempos, however, it may be difficult to determine the locations and characteristics of exposures that result in subsequent illnesses, especially those with long incubation times. In case 1 above, for example, there was initial concern that the case heralded the re-emergence of malaria in a previously malaria-free area of Panama. It is now considered most likely, however, that the cases reported above were acquired in Korea during the 1997 transmission season.

Vivax malaria of Korean origin has a well documented propensity for delayed (e.g., 6-9 months) clinical presentation.[2-4] Studies in Korea have shown that delayed manifestations of malaria infections may occur in 40%-50% of cases.[2-4] Thus, as many as 2 of 5 soldiers who acquire malaria in Korea each year may leave the country with asymptomatic, undiagnosed, and thus untreated hypnozoite (liver) stage infections. Such individuals are likely to develop significant symptoms for the first time at their new duty stations or civilian homes (i.e., after leaving military service). Depending on the times (e.g., seasons) and locations of clinical exacerbations, and the knowledge and experience of local careproviders, clinical suspicion of malaria may be low, diagnoses may be delayed, and therapies may be inappropriate.[5]

Malaria rates in Korea have approximately tripled each year since its documented re-emergence in 1993.[4] During the 1997 transmission season, 27 US soldiers were diagnosed with malaria in Korea.[4] Since the end of last year's transmission season, 20 cases (9 from Korea, 10 from US, 1 from Europe) have been reported. Thus, providers of medical care to soldiers and recently discharged military veterans and retirees should be alert to late presentations of vivax malaria of Korean origin. Specifically, malaria should be suspected in any individual with an acute febrile illness of unknown cause who served in Korea, especially north of the Imjin River, during the previous summer-fall malaria transmission season.

In some cases, the geographic origins of *P. vivax* strains can be inferred from characteristic sequences in variable regions of their genes. If malaria diagnoses are uncertain or locations of etiologic exposures are unknown, military careproviders may submit blood specimens for genetic analysis to the Department of Immunology

Continued from page 9

(LTC Chris Ockenhouse/LTC Patrick Duffy), Division of Communicable Diseases and Immunology, Walter Reed Army Institute of Research (WRAIR). Whole blood from symptomatic patients should be shipped (for same day or overnight delivery) in purple or green top tubes on wet ice or, alternatively, as dried blood on filter paper strips. A clinical, laboratory, or preventive medicine staff member familiar with the case should contact the laboratory at WRAIR prior to shipment to coordinate specimen collection, processing, delivery, and reporting of results (telephone: 202.782.0200/1234/0858, fax: 202.782.0748, DSN: 662.xxxx).

Soldiers must be trained to protect themselves against the ubiquitous threats presented by arthropod-transmitted diseases. The DoD Insect Repellent System prescribes personal protection measures (PPMs) – including topical application of extended duration 33% DEET lotion, treatment of field uniforms with permethrin, proper wear of the battle dress uniform, and proper use of bednets – that are safe and highly effective when properly employed.[6] In turn, chains of command must ensure the delivery of appropriate PPM equipment and supplies to all soldiers, and they must enforce PPM discipline. This summer, the Korean Army expanded its chemoprophylactic coverage of soldiers it considered at high malaria risk. In addition, malaria chemoprophylaxis is now routinely provided to US soldiers who train in three relatively high risk areas (i.e., 1997 malaria attack rates of 1-3 per 1,000 per week) near the DMZ.

Finally, surveillance of malaria throughout the military services is essential to detect emerging threats and to plan and monitor effects of chemoprophylactic and other preventive interventions. Since the time of its re-emergence, US Army preventive medicine staffs in Korea have conducted aggressive vector control and clinical case surveillance programs.[4] US Air Force public health officials at Howard Air Force Base in Panama also conduct surveillance of the Fort Sherman/JOTC area to document mosquito species, track their distributions and densities, and detect malaria cases should they occur.

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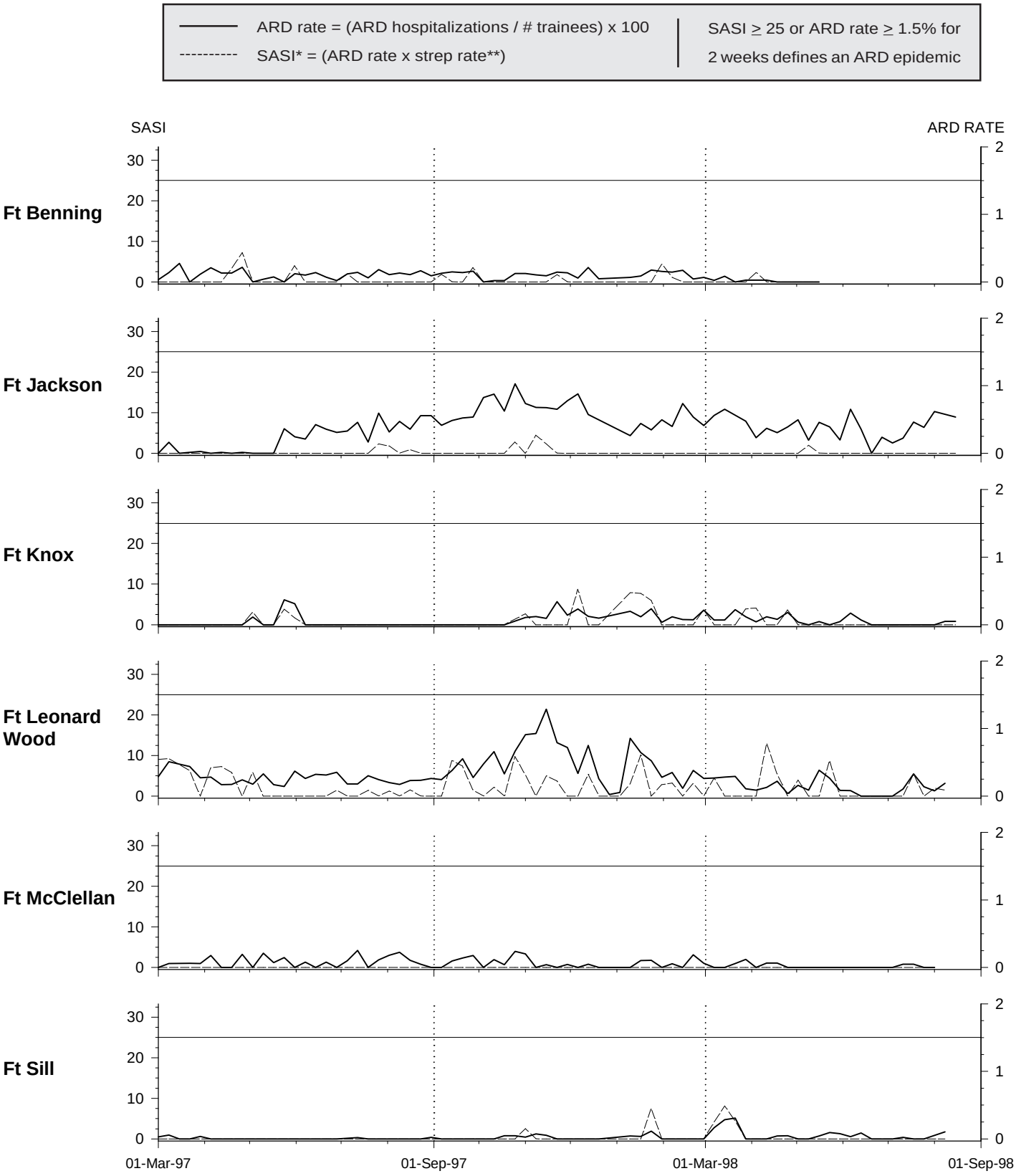
Figure III. Acute respiratory disease (ARD) surveillance update, US Army initial entry training centers



* SASI (Strep ARD Surveillance Index) is a reliable predictor of serious strep-related morbidity

** Strep rate = (Group A beta-hemolytic strep(+) / # cultures) x 100

Case Report

Hyposmolality Related to Excessive Water Consumption During Heat Stress, Fort Leonard Wood

On the afternoon of 25 June 1998, an 18 year old female Native American soldier was transported to the Fort Leonard Wood Army Community Hospital with dizziness, lightheadedness, headache, and malaise of approximately three hours duration. During the day, as the heat index rose to category 5 (WBGT index > 90°F), she had consumed large amounts of water but not much food.

In the emergency room, she had tonic-clonic seizures, and soon afterwards, she vomited and became combative. Her serum sodium was 117 mg/dl. She was sedated, infused with two liters of normal saline, and admitted to the medical intensive care unit (MICU). She had no significant prior medical illnesses.

In the MICU, her serum electrolyte concentrations were sodium 117, potassium 3.6, chloride 89, and bicarbonate 15 (the calculated anion gap was 13). Her serum osmolality was 244, and urine osmolality was 365. Free water excess was estimated as 5.74 liters. Her first night in the MICU was characterized by increasing combativeness and worsening respiratory distress. A chest x-ray revealed pulmonary edema. She underwent endotracheal intubation, was placed on mechanical ventilatory support, and was more deeply sedated. Over the next 36 hours, she had a significant diuresis (during her first four days in the hospital, she produced approximately 30 liters of urine), gradual normalization of her fluid and electrolyte imbalances, and progressive clinical improvement. She was extubated on the second hospital day and moved to the general medical ward on the fifth day. She was discharged with easy fatigability but no other significant sequelae. She was expected to return to full duty after a brief convalescent leave.

Fluid replacement policy for warm weather training

(Average acclimated soldier wearing battle dress uniform (BDU), hot weather)

		Easy Work		Moderate Work		Hard Work	
Heat category	WBGT Index, °F	Work/rest (min.)	Water intake (qt/hr)	Work/rest (min.)	Water intake (qt/hr)	Work/rest (min.)	Water intake (qt/hr)
1	78 - 81.9	NL*	½	NL*	¾	40/20	¾
2	82 - 84.9	NL*	½	50/10	¾	30/30	1
3	85 - 87.9	NL*	¾	40/20	¾	30/30	1
4	88 - 89.9	NL*	¾	30/30	¾	20/40	1
5	> 90	50/10	1	20/40	1	10/50	1

* NL: no limit to work time per hour.

Note: The work/rest times and fluid replacement volumes will sustain performance and hydration for at least 4 hours of work in the specified heat category. Rest means minimal physical activity (e.g., sitting or standing) and should be accomplished in shade if possible. Individual water needs will vary by up to ¼ quart per hour. MOPP gear adds 10°F to WBGT index.

Caution: Hourly fluid intake should not exceed 1½ quarts.
Daily fluid intake should not exceed 12 quarts.

Editorial comment: During the summer of 1997, multiple cases of hyposmolality/hyponatremia secondary to excessive water consumption were reported from Army training centers.[1] Several cases required intensive medical care and one was fatal. The September 1997 issue of the MSMR reported guidelines developed by a multidisciplinary team at Fort Benning that limited the consumption of water during heat stressful conditions and that directed the evacuation to definitive medical care of all heat stressed soldiers who did not respond within one hour to field resuscitation efforts (e.g., rest, cooling, limited water).[2] Through the winter and spring, scientists at the US Army Research Institute of Environmental Medicine (USARIEM), Natick, Massachusetts, developed new guidelines for fluid replacement during military training. In April 1998, the new USARIEM guidelines were disseminated by the Office of the Surgeon General as new Army policy guidance (table).[3] The new guidelines supersede those published in the Army technical bulletin (TB MED 507) that addresses the prevention, treatment, and control of heat injury.[4] Of particular note, the new guidance limits fluid intake regardless of heat category or work level to no more than 1½ quarts hourly or 12 quarts daily.

Through June of this year, there have been eight cases (no fatalities) of hyposmolality secondary to excessive water consumption reported from Army training centers. Hyposmolality/hyponatremia secondary to excessive water consumption lies at one end of a spectrum of heat-related illnesses. By far, the most significant heat-associated threat to soldiers, however, continues to derive from insufficient rather than excessive water consumption. During heat waves such as those that have occurred throughout the US this summer, medical staffs and training cadre must carefully plan, widely disseminate, and rigorously enforce comprehensive heat casualty prevention guidelines so that soldiers can train effectively in hot and humid weather while avoiding the risks associated with inadequate water consumption on one hand and excessive water consumption on the other.

Report submitted by Pecos Coble, CPT, MC, Internal Medicine Service, and Robert Greenup, Preventive Medicine Service, Fort Leonard Wood, Missouri.

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2. USACHPPM. Hyponatremia associated with heat stress and excessive water consumption: outbreak investigation and recommendations. MSMR, 1997, 3:6 (September), 9-10.
3. Memorandum, subject: Policy guidance for fluid replacement during training, Department of the Army, Office of the Surgeon General, dated 29 April 1998.
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Surveillance Trends

Trends in Hospitalizations due to Mental Disorders, US Army Active Duty Soldiers

Of the 31,036 hospitalizations of active duty soldiers in US military hospitals during 1997, 4,220 (13.6%) were due to mental disorders (ICD-9-CM: 290-319) (figure 1). Based on primary discharge diagnoses, mental disorders were the third leading cause of soldier hospitalizations — behind only complications of pregnancy, childbirth, and the puerperium (ICD-9-CM: 630-677) and diseases of the musculoskeletal system and connective tissue (ICD-9-CM: 710-739). In 1997, of the 166,913 total soldier sickdays (which include hospitalizations, convalescent leave, and medical hold), more than one fourth (27.8%, 46,333 days) were attributable to mental disorders.

Each year from 1990 to 1997, the three most common mental disorder-associated diagnoses were adjustment reaction (ICD-9-CM: 309), alcohol dependence syndrome (ICD-9-CM: 303), and affective psychoses (ICD-9-CM: 296) (figure 2). In 1997, adjustment reactions accounted for 42.1% of all hospitalizations due to mental disorders (5.8% of all-cause hospitalizations) and 27.6% of sickdays related to mental disorders (7.6% of all-cause sick days).

Rates of all-cause hospitalizations of active duty soldiers have declined continuously from 1990 through 1997 (figure 3). In 1997, the decline was more prominent than in previous years, perhaps in response to new managed care initiatives[1]. Over the same period, hospitalization rates for alcohol dependence also declined continuously while, in contrast, hospitalization rates for adjustment reactions and affective psychoses remained relatively stable. For this report, hospitalizations for adjustment reactions were assessed in more detail since they were the predominant reason for mental disorder-related hospitalizations of soldiers, and their trend was markedly different from the declining overall trend.

Between 1990 and 1997, hospitalization rates for adjustment reactions increased rapidly among soldiers younger than 20 but decreased among soldiers older than 30 (Figure 4). In 1997, the hospitalization rate for adjustment reactions was nearly 10-fold higher among soldiers younger than 20 than those 40 or older. Females younger than 20 had the highest rate of all age- and gender-defined subgroups. In fact, the rate among teenaged females was twice that among teenaged males (females: 16 hospitalizations per 1,000 soldier-years, males: 8 hospitalizations per 1,000 soldier-years [figure 5]).

In general, females were hospitalized earlier in their military careers than males. In 1996, among soldiers younger than 20, the median weeks of military service at the time of hospitalizations for adjustment reactions was 26 for males and 22 for females (figure 6). In recent years, among both males and females, adjustment reaction hospitalizations have tended to occur earlier in service. For example, in 1996 compared to 1992, adjustment reaction hospitalizations occurred approximately eight and six weeks earlier among males and females, respectively (figure 7).

Finally, more than 60% of soldiers hospitalized for adjustment reactions were separated from military service within six months of their hospitalizations. This experience markedly varies from that among soldiers hospitalized, for example, with appendicitis (figure 8).

Report submitted by Jeff Lange, PhD, Army Medical Survieillance Activity, USACHPPM

Editorial comment: In the past decade, hospitalization rates for mental disorders have remained relatively stable while hospitalization rates overall have significantly declined. In turn, mental disorders have accounted for increasingly

larger proportions of all soldier hospitalizations. In 1997, more than one of eight hospitalizations of soldiers were for mental disorders, and of those, more than 40% were for adjustment reactions. Since 1992, rates of adjustment reaction hospitalizations have remained relatively stable generally — but they have increased strikingly among teenaged soldiers. In recent years, hospitalizations of teenaged soldiers for adjustment reactions have occurred earlier in their service careers, but still beyond the period of initial entry (basic) and advanced individual training (based on median times in service when hospitalized). This experience suggests a need for prevention efforts targeted at young first term soldiers, especially females, not only during their basic and advanced training, but also during their first permanent duty assignments. In addition, fewer than half of all teenaged soldiers who were hospitalized for adjustment reactions remained on active duty more than six months after their hospitalizations. The finding is consistent with previous studies among military trainees that documented significant relationships between indicators of mood of new trainees and their success in basic training.[2-4] Perhaps new post-hospitalization followup procedures should be developed and assessed, at least in part, in relation to effects on attrition from military service of soldiers, particularly teenagers, who are hospitalized for adjustment reactions.

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1. USACHPPM. Hospitalizations and noneffective days, 1997. Medical Surveillance Monthly Report (MSMR), 1998,, 4:3, p.2.
2. Lubin, B, Fiedler, ER, Van Whitlock, R. Mood as a predictor of discharge from Air Force basic training. J Clin Psychol, 1996, 52:2(Mar), 145-151.
3. Vassend, O, Watten, R, Myhrer, T, Syvertsen, JL. Negative affectivity and intellectual ability: a study of their relation to self-reported physical symptoms, perceived daily stress and mood, and disciplinary problems in military recruits. Soc Sci Med, 1994, 39:4(Aug), 583-590.
4. Biersner, RJ, LaRocco, JM, Ryman, DH. Mood scales as predictors of discharge and sick call visits during basic military training. Mil Med, 1976, 141:12(Dec), 859-861.

Figure 1. Hospitalizations (%) by major diagnostic categories, active duty soldiers, 1997 (N = 31,036)

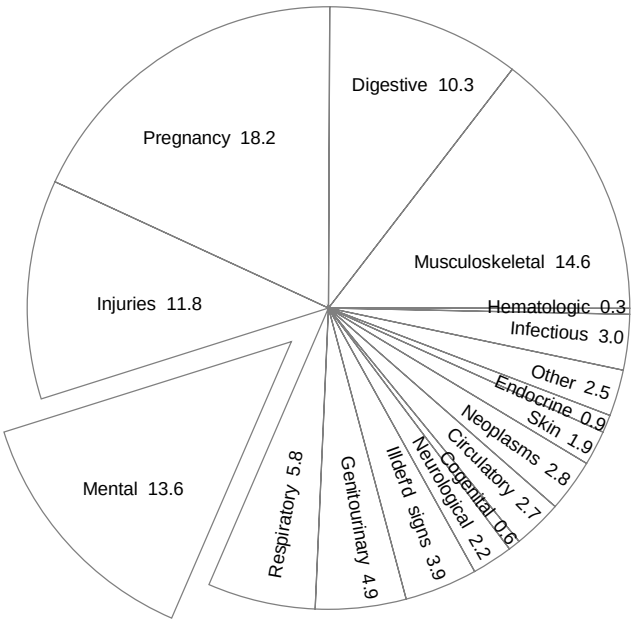


Figure 2. Mental health hospitalizations (%) by diagnostic criteria, active duty soldiers, 1997

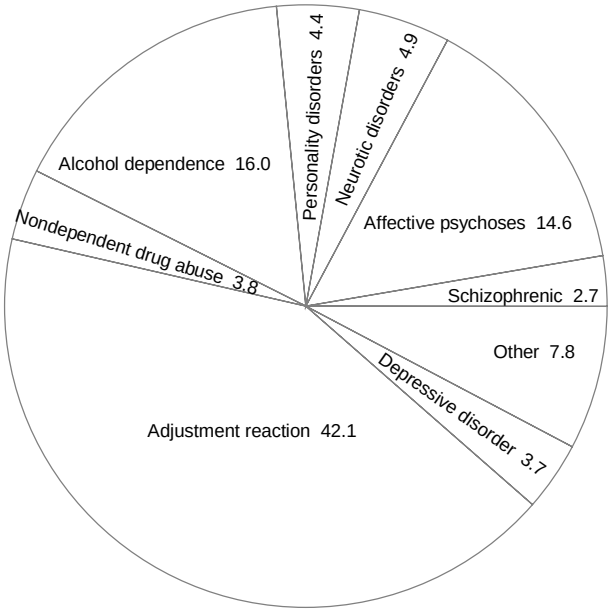


Figure 3. Select mental health hospitalizations rates, active duty soldiers, 1990-1997

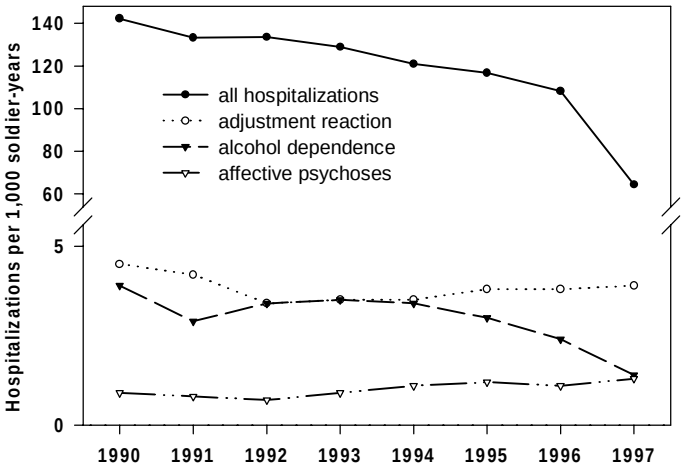


Figure 4. Adjustment reaction hospitalization rates, by age groups, active duty soldiers, 1990-1997

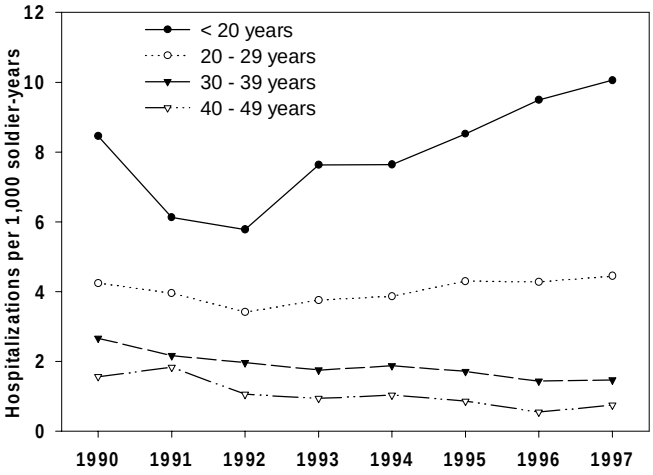


Figure 5. Adjustment rection hospitalization rates, by age groups and gender, active duty soldiers, 1997

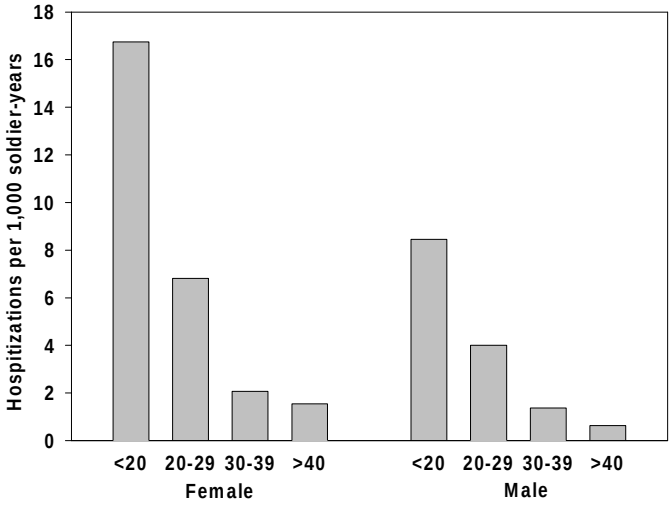


Figure 6. Weeks of service before adjustment reaction hospitalization, age group < 20 years, by gender, active duty soldiers, 1990-1996

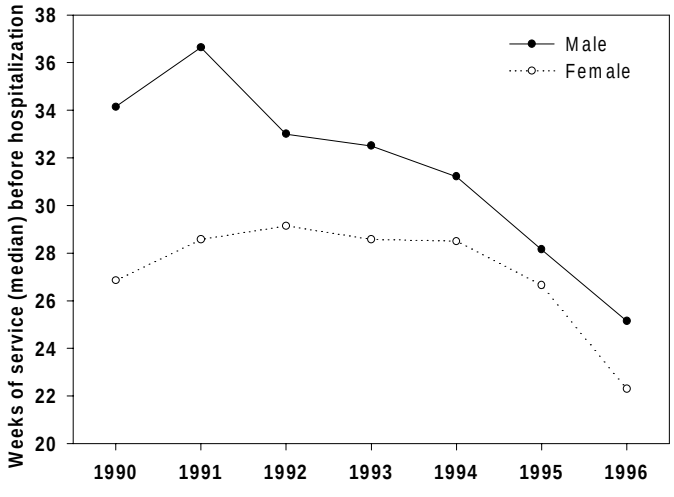


Figure 7. Weeks of service before adjustment reaction hospitalization, age group <20 years, by gender, active duty soldiers, 1992 vs. 1996

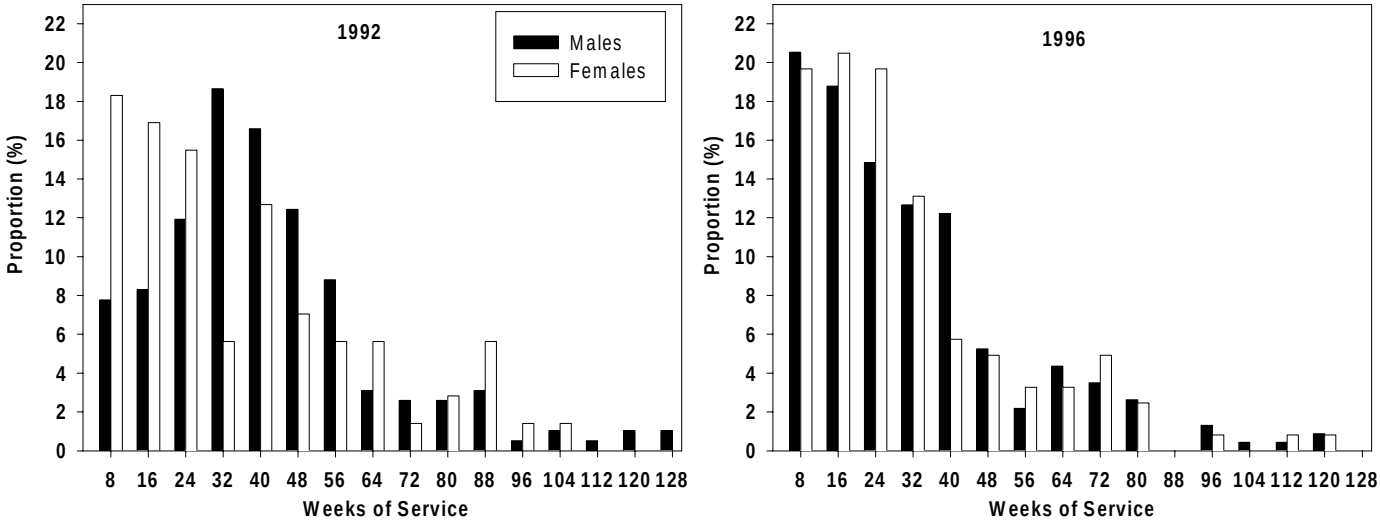
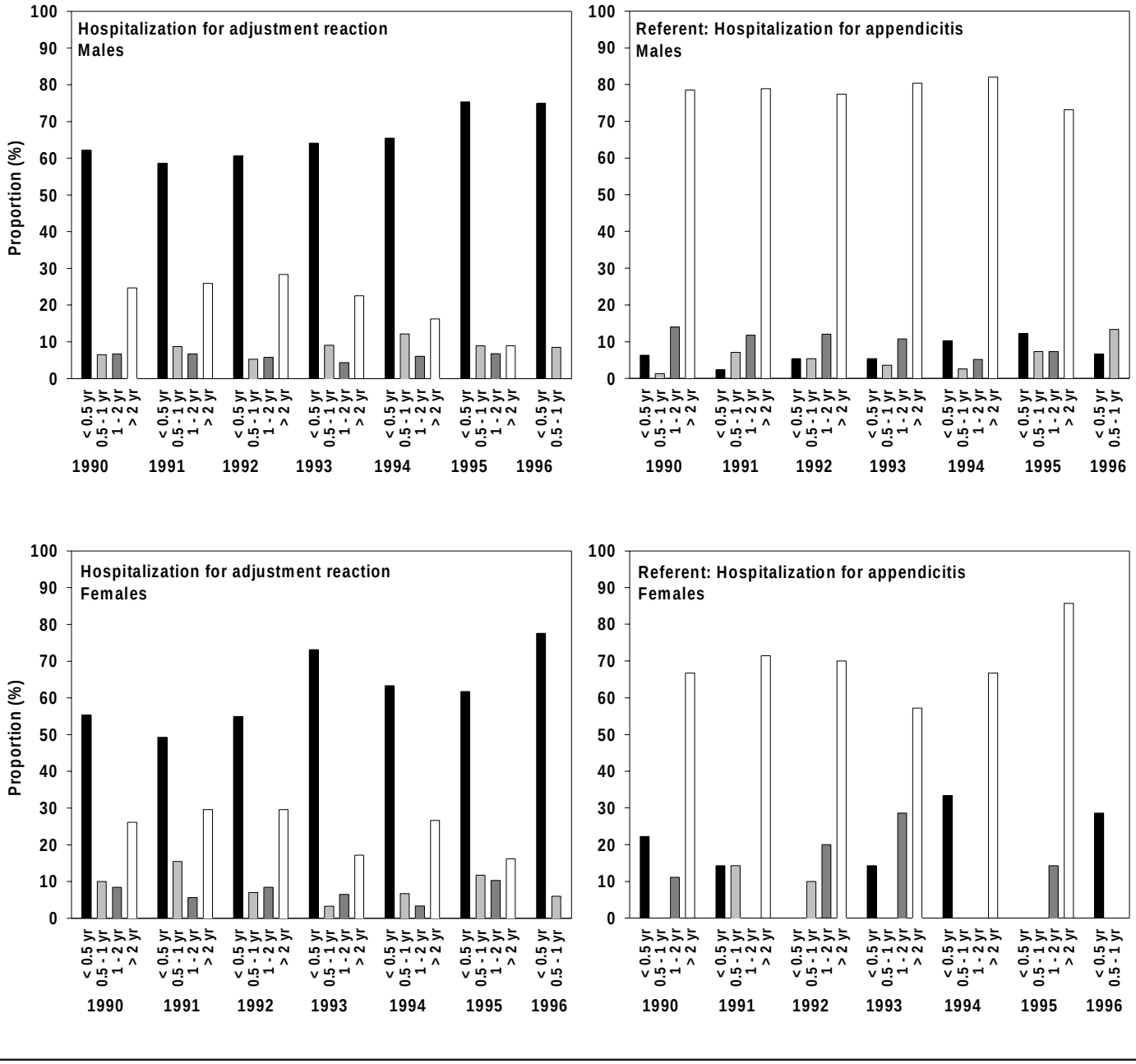


Figure 8. Active duty service after hospitalization, adjustment reaction vs. appendicitis, age group < 20 years, by gender, active duty soldiers, 1990-1996



Supplement #1

Update: HIV-1 Antibody Testing among Soldiers and Civilian Applicants for Military Service

For more than a decade, the Department of Defense has conducted routine, periodic screening of active and reserve component servicemembers to detect infections with human immunodeficiency virus, type 1 (HIV-1). In addition, since October 1985, all civilian applicants for military service have been screened for antibodies to HIV-1 during preinduction medical examinations at Military Entrance Processing Stations (MEPS). This report summarizes recent results of screening for HIV-1 among soldiers and civilian applicants for military service.

For active, reserve, and National Guard soldiers, new HIV-1 infections were included in rate calculations when dates and identifiers (i.e., SSN) of each individual's first HIV-1 positive test exactly matched identifiers in contemporaneous personnel files. Denominators for calendar-year-specific rate calculations were the number of individuals on contemporaneous personnel files of subject components who were tested at least once during subject years. Finally, annual rates of HIV-1 detection among civilian applicants for military service were calculated by dividing the number of civilian applicants with a first positive HIV-1 test during the year by the total number of civilian applicants tested during the year.

Active duty soldiers: During 1997 and the first half of 1998, 83 soldiers were diagnosed with HIV-1 infections. Rates of detection of HIV-1 in 1997 (0.22 per 1,000 screened) and during the first half of 1998 (0.17 per 1000 screened) were lower than in 1996 and thus extended the ten year trend of slow but inexorable decline (table S1). The 10-year trend among male soldiers reflected the overall trend while infection rates among female soldiers remained relatively stable during the period (figure S1). From 1988 through June 1998, 2,637 active duty soldiers were diagnosed with HIV-1 infections — approximately one of eight (11.8%) of them remain on active duty. Fewer than 4% of those diagnosed in 1988 but greater than 83% of those diagnosed in 1997 continue in active Army service.

Reserve components: Tables S2, S3 and figures S2, S3 summarize results of recent HIV-1 testing among members of the Army Reserve and National Guard. Among Army Reserve soldiers, rates in 1997 and the first half of 1998 (0.39 per 1000) were higher than for any year since 1992; and since 1994, rates of new diagnoses have tended to increase among Army Reservists. In contrast, the HIV-1 detection rate among Army National Guardsmen was lower in 1997 (0.16 per 1000) than in any other year of the past decade.

Civilian applicants for military service: Since October 1985, there have been nearly five million civilian applicants for military service screened for antibodies to HIV-1. Overall, 4,276 (0.86 per 1000) applicants had antibodies to HIV-1 at their first MEPS examination, and 538 others were negative at their first but positive at a subsequent examination. Detection rates have been relatively stable overall as well as in gender and racial-ethnic subgroups for approximately the last six years.

Editorial comment: In general, in the past decade, rates of detection of new HIV-1 infections among active duty soldiers, National Guardsmen, and civilian applicants for military service have declined or remained relatively stable. In 1995, the Army Reserves transitioned from biennial to every five year mandatory HIV-1 testing, and at least partially as a result, beginning in 1995, HIV-1 detection rates have increased among Army Reservists (since as the screening interval lengthens, more newly acquired HIV-1 infections accumulate in the screened population between sequential tests).

Table S1. Rates of new diagnoses of HIV-1 infections, Army active duty, 1988 - 1998

Year	Total Persons Tested	Males Tested	Females Tested	Total Newly Identified HIV Positives	Newly Identified HIV Positive Males	Newly Identified HIV Positive Females	Total Rate per 1000 tested	Male Rate per 1000 tested	Female Rate per 1000 tested	HIV Positives Currently on Active Duty
1988	380,034	334,082	45,952	194	187	7	0.51	0.56	0.15	7
1989	403,657	355,298	48,359	167	161	6	0.41	0.45	0.12	9
1990	439,396	384,398	54,998	153	144	9	0.35	0.37	0.16	11
1991	394,885	345,378	49,507	134	128	6	0.34	0.37	0.12	13
1992	426,826	373,668	53,158	125	117	8	0.29	0.31	0.15	23
1993	368,814	320,225	48,589	91	88	3	0.25	0.27	0.06	21
1994	340,874	293,767	47,107	79	74	5	0.23	0.25	0.11	26
1995	316,054	271,847	44,207	75	70	5	0.24	0.26	0.11	41
1996	285,939	243,586	42,353	65	60	5	0.23	0.25	0.12	38
1997	275,919	233,394	42,525	60	53	7	0.22	0.23	0.16	50
1998	135,387	113,269	22,118	23	20	3	0.17	0.18	0.14	27
Total	**4,480,538**	**3,906,847**	**573,691**	**2,480**	**2,357**	**123**				**293**

Figure S1. Rates of new diagnoses of HIV-1 infections, Army active duty, 1988 - 1998

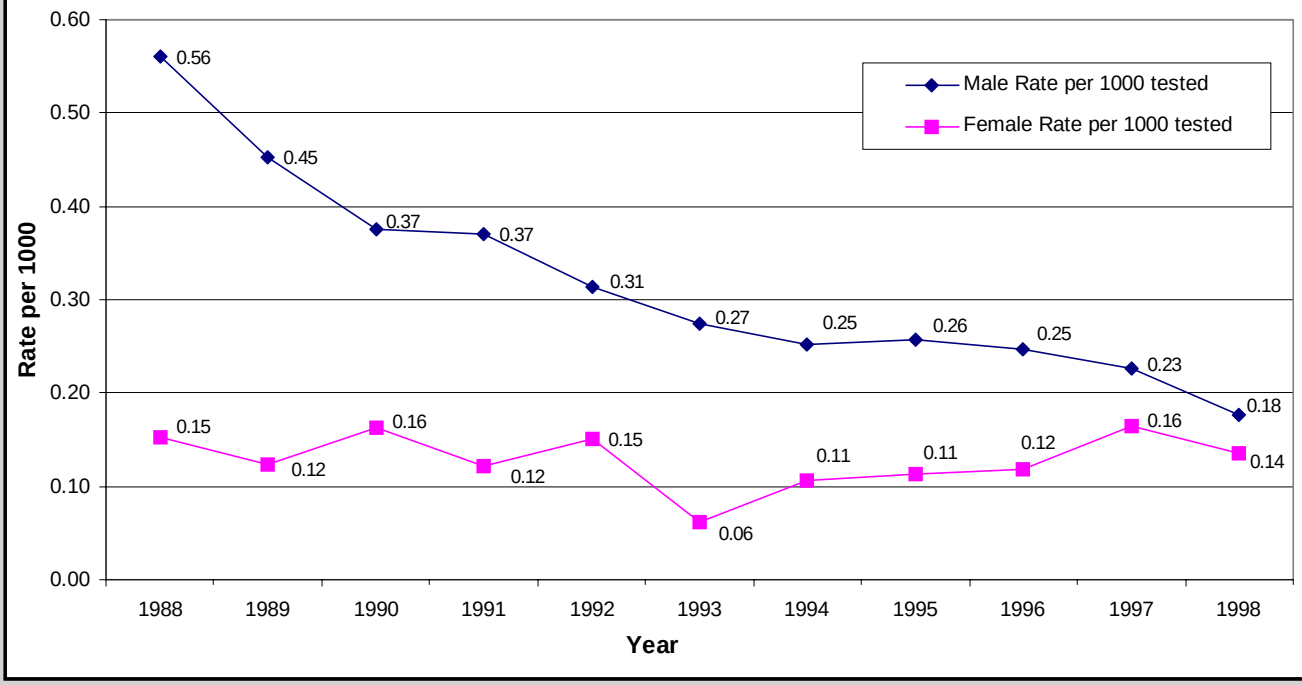


Table S2. Rates of new diagnoses of HIV-1 infections, Army Reserve, 1988 - 1998

Year	Total Persons Tested	Males Tested	Females Tested	Total Newly Identified HIV Positives	Newly Identified HIV Positive Males	Newly Identified HIV Positive Females	Total Rate per 1000 tested	Male Rate per 1000 tested	Female Rate per 1000 tested	HIV Positives Currently on Active Duty
1988	82,350	66,562	15,788	75	73	2	0.91	1.10	0.13	1
1989	146,177	118,172	28,005	76	71	5	0.52	0.60	0.18	2
1990	149,257	119,282	29,975	73	70	3	0.49	0.59	0.10	1
1991	107,405	85,628	21,777	58	56	2	0.54	0.65	0.09	0
1992	156,926	125,162	31,764	63	53	10	0.40	0.42	0.31	2
1993	128,407	102,597	25,810	44	40	4	0.34	0.39	0.15	3
1994	120,905	95,361	25,544	27	22	5	0.22	0.23	0.20	4
1995	93,472	73,674	19,798	27	21	6	0.29	0.29	0.30	3
1996	45,467	35,378	10,089	13	13	0	0.29	0.37	0.00	9
1997	39,751	30,175	9,576	15	13	2	0.38	0.43	0.21	13
1998	15,245	11,617	3,628	6	5	1	0.39	0.43	0.28	6
Total	**1,235,852**	**986,972**	**248,880**	**522**	**479**	**43**				**47**

Figure S2. Rates of new diagnoses of HIV-1 infections, Army Reserve, 1988 - 1998

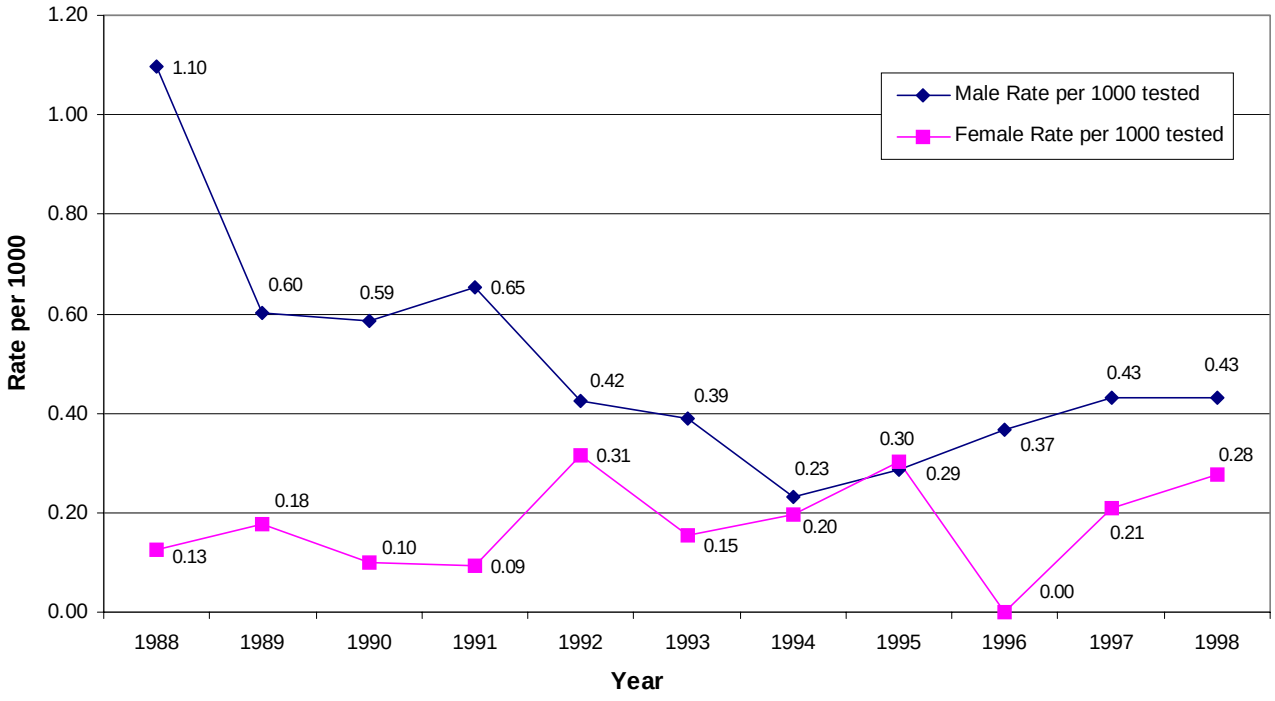


Table S3. Rates of new diagnoses of HIV-1 infections, Army National Guard, 1988 - 1998

Year	Total Persons Tested	Males Tested	Females Tested	Total Newly Identified HIV Positives	Newly Identified HIV Positive Males	Newly Identified HIV Positive Females	Total Rate per 1000 tested	Male Rate per 1000 tested	Female Rate per 1000 tested	HIV Positives Currently on Active Duty
1988	145,806	137,366	8,433	43	39	4	0.29	0.28	0.47	6
1989	158,304	149,120	9,168	57	55	2	0.36	0.37	0.22	4
1990	211,096	196,282	14,790	66	64	2	0.31	0.33	0.14	0
1991	175,712	164,245	11,449	58	54	4	0.33	0.33	0.35	2
1992	234,008	216,899	17,090	55	53	2	0.24	0.24	0.12	2
1993	157,944	146,355	11,573	36	35	1	0.23	0.24	0.09	2
1994	185,822	171,274	14,518	34	31	3	0.18	0.18	0.21	7
1995	139,107	128,909	10,190	33	30	3	0.24	0.23	0.29	8
1996	57,377	52,630	4,737	18	17	1	0.31	0.32	0.21	4
1997	66,818	60,541	6,268	11	10	1	0.16	0.17	0.16	8
1998	33,804	30,775	3,027	8	8	0	0.24	0.26	0.00	9
Total	**1,889,337**	**1,761,218**	**127,945**	**489**	**462**	**27**				**54**

Figure S3. Rates of new diagnoses of HIV-1 infections, Army National Guard, 1988 - 1998

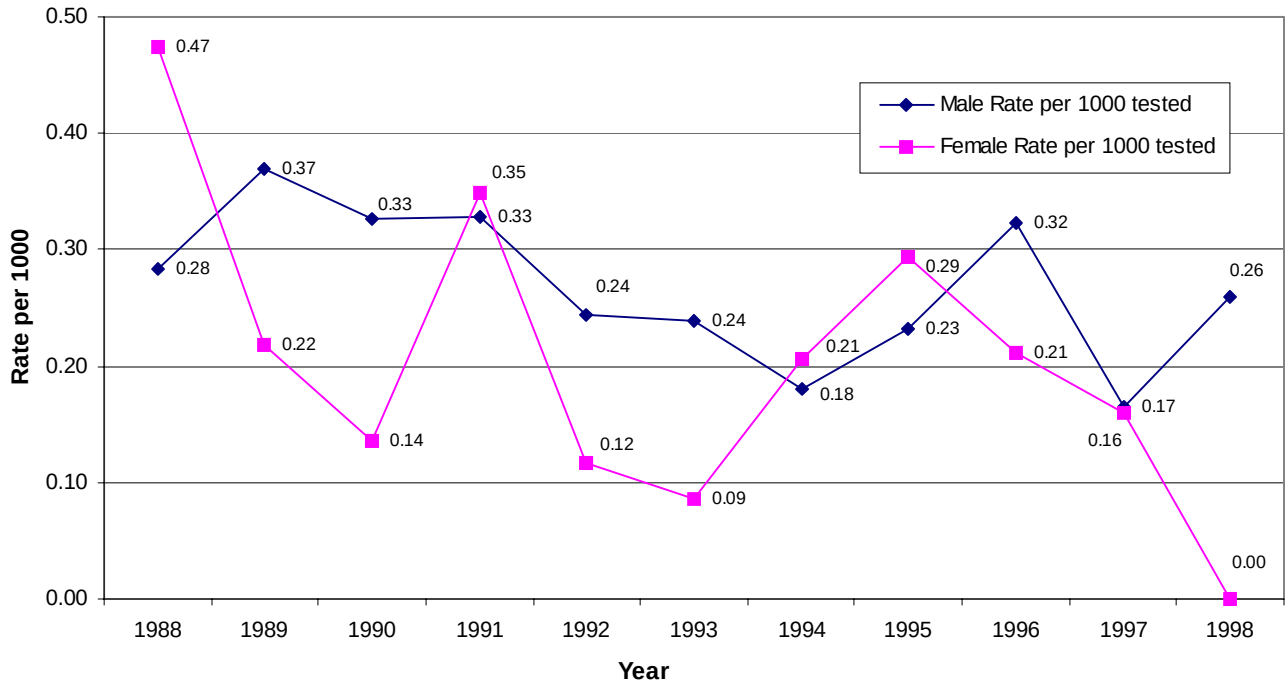


Figure S4. Prevalence of antibody to HIV-1, civilian applicants for US military service, by gender and year of screening, 1985/86 - 1998

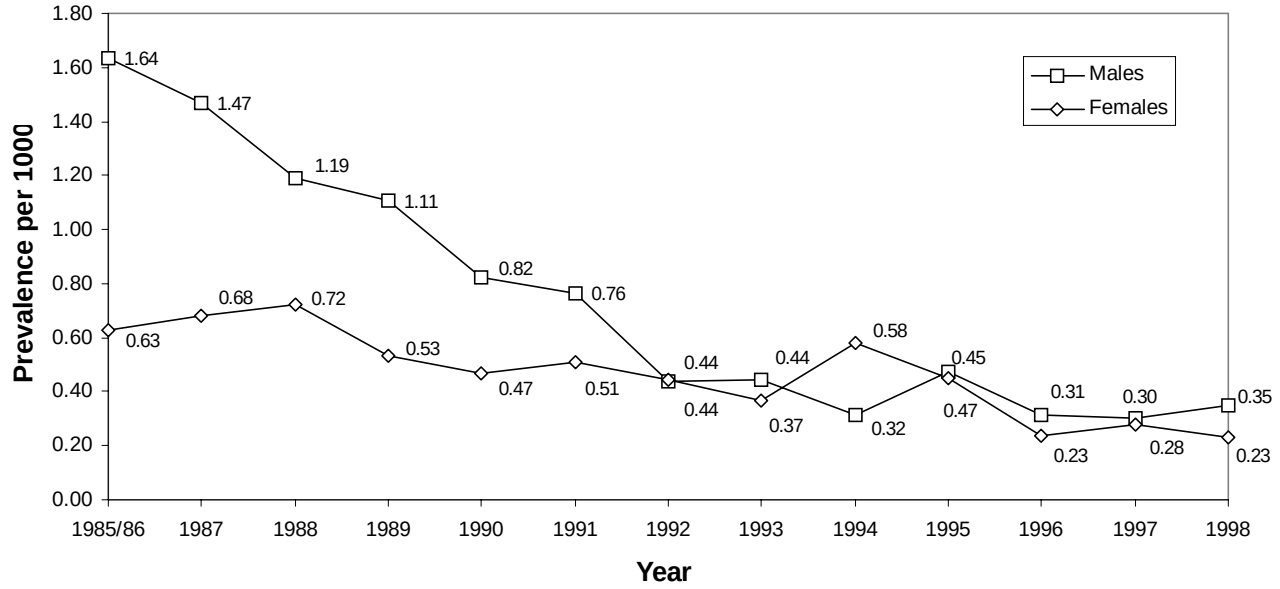


Figure S5. Prevalence of antibody to HIV-1, civilian applicants for US military service, by race/ethnicity and year of screening, 1985/86 - 1998

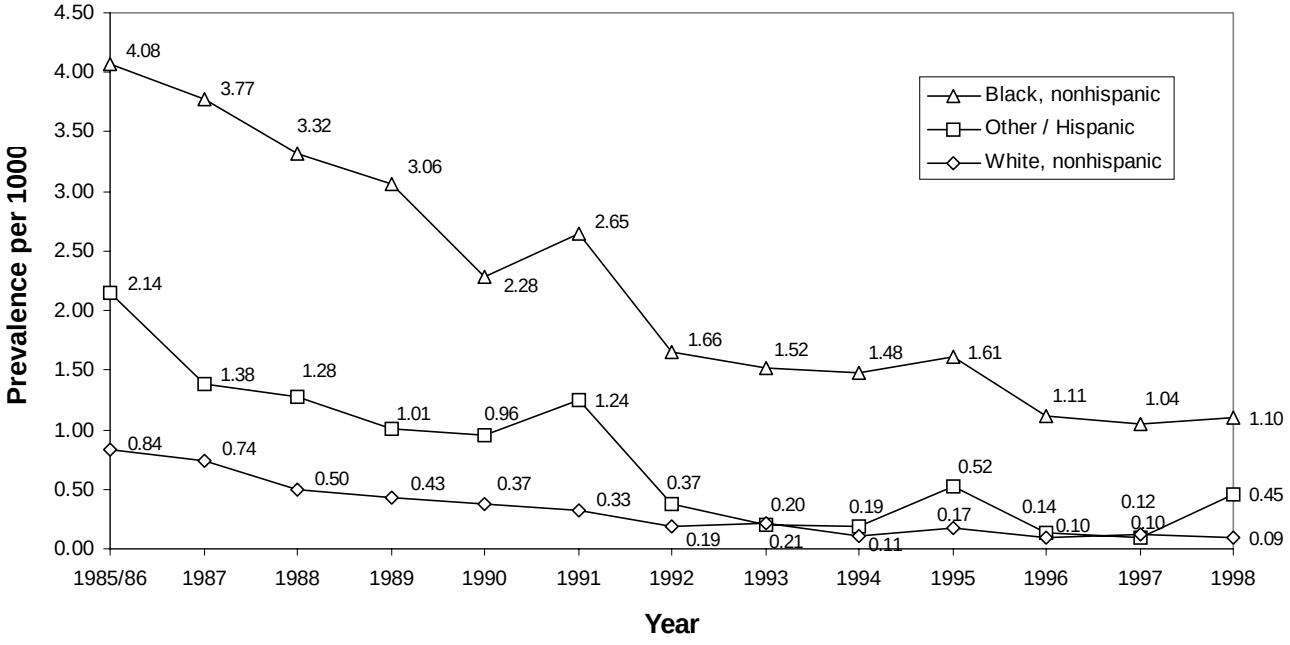


Table S4. HIV-1 tests, US Army Active Duty, Reserve, and National Guard, 1997

Test purpose	Active Duty	Reserve	National Guard	Total
Clinical / STD	17,780	828	545	19,153
Force testing	225,154	28,342	46,493	299,989
Physical exam	45,241	6,878	5,711	57,830
Other / Unknown	40,866	5,594	17,000	63,460
Total tests	**329,041**	**41,642**	**69,749**	**440,432**
Total persons tested	**275,919**	**39,751**	**66,818**	**382,488**
Number positive	**60**	**15**	**11**	**86**
Prevalence per 1000	**0.22**	**0.38**	**0.16**	**0.22**

Supplement #2: Reportable Diseases

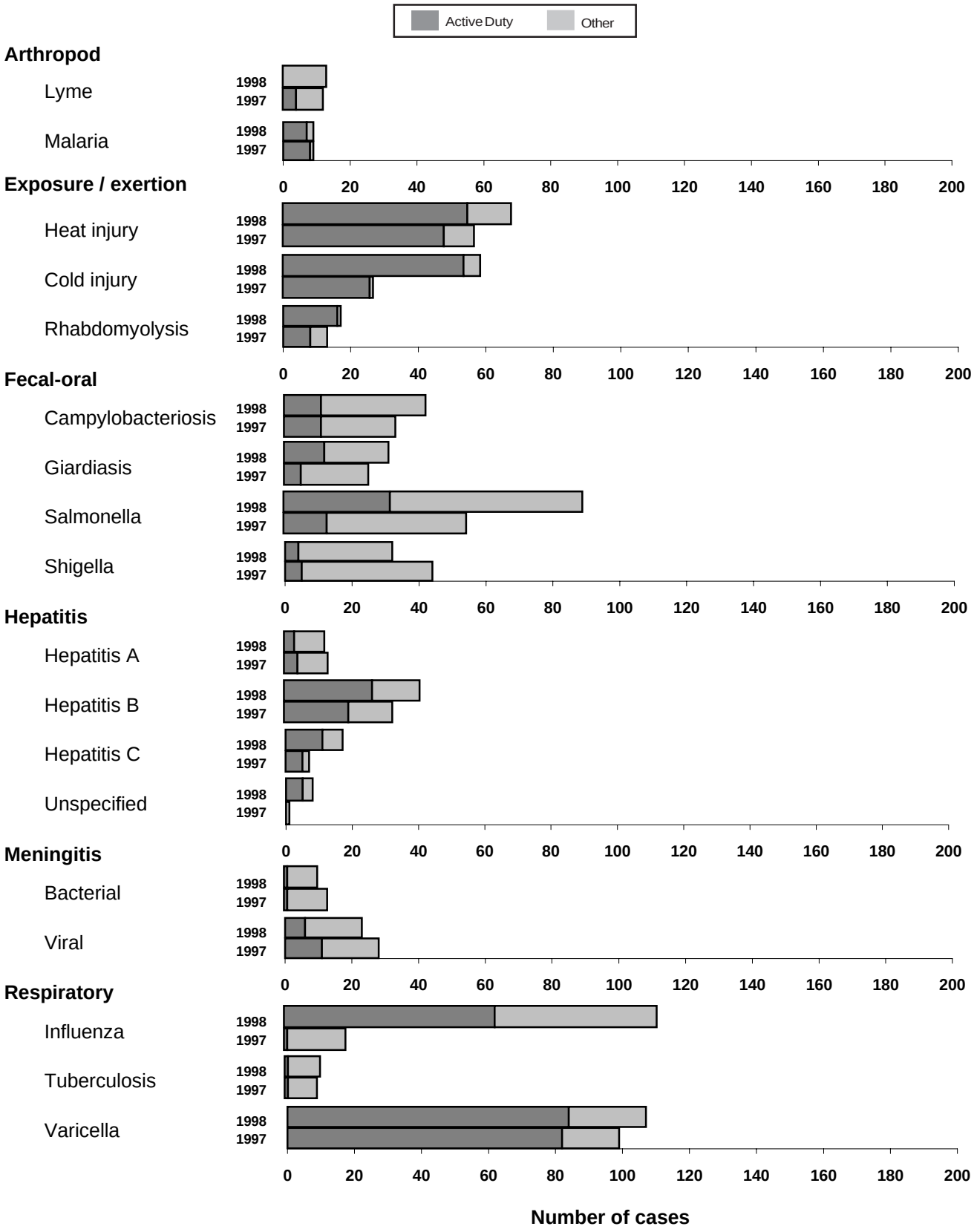
TABLE S1. Reportable conditions reported through Medical Surveillance System, Jan-Jun 1998*

Diagnosis	1st Quarter	2nd Quarter	Total	Diagnosis	1st Quarter	2nd Quarter	Total
Amebiasis	0	1	**1**	Malaria, falciparum	0	0	**0**
Anthrax	0	0	**0**	Malaria, malariae	0	0	**0**
Arboviral fever, unsp.	0	0	**0**	Malaria, ovale	0	2	**2**
Asbestosis	0	0	**0**	Malaria, unspecified	0	1	**1**
Botulism	0	1	**1**	Malaria, vivax	2	4	**6**
Brucellosis	0	0	**0**	Measles	4	2	**6**
Campylobacteriosis	16	26	**42**	Meningitis, Viral	14	9	**23**
Carbon monoxide intx.	5	0	**5**	Meningitis, Bact.	5	5	**10**
Chancroid	0	0	**0**	Mercury intoxication	0	0	**0**
Chemical agent exp.	0	1	**1**	Mumps (adults only)	3	1	**4**
Chlamydia	1676	1337	**3013**	Mycobacterial inf.	3	2	**5**
Cholera	0	1	**1**	Pertussis	1	5	**6**
Coccidioidomycosis	0	1	**1**	Plague	0	0	**0**
CWI, frostbite	39	1	**40**	Pneumococcal pneum.	3	0	**3**
CWI, hypothermia	6	0	**6**	Poliomyelitis	0	0	**0**
CWI, immersion type	8	0	**8**	Psittacosis	0	0	**0**
CWI, unspecified	4	1	**5**	Q fever	0	0	**0**
Dengue fever	0	0	**0**	Rabies, human	0	0	**0**
Diphtheria	0	0	**0**	Radiation injury	0	0	**0**
Ehrlichiosis	0	0	**0**	Relapsing fever	0	0	**0**
Encephalitis	0	0	**0**	Reye syndrome	0	0	**0**
Giardiasis	21	10	**31**	Rhabdomyolysis	10	7	**17**
Gonorrhea	546	438	**984**	Rheumatic fever	1	0	**1**
Granuloma Inguinale	1	0	**1**	Rift Valley Fever	0	0	**0**
Guillain-Barre Syndrome	1	2	**3**	RMSF	0	3	**3**
H. influenzae, inv.	1	0	**1**	Rubella	0	0	**0**
Heat exhaustion	3	38	**41**	Salmonellosis	35	55	**90**
Heat stroke	7	20	**27**	Schistosomiasis	0	0	**0**
Hemorrhagic fever	0	0	**0**	Shigellosis	17	15	**32**
Hepatitis A, Acute	6	6	**12**	Syphilis, congenital	0	0	**0**
Hepatitis B, Acute	26	14	**40**	Syphilis, tertiary	0	3	**3**
Hepatitis C, Acute	13	4	**17**	Syphilis, latent	2	8	**10**
Hepatitis, unspec.	6	2	**8**	Syphilis, prim/sec	7	8	**15**
Herpes Simplex	231	141	**372**	Syphilis, unspec.	12	13	**25**
Influenza	115	0	**115**	Tetanus	1	0	**1**
Kawasaki syndrome	4	2	**6**	Toxic shock syndrome	2	0	**2**
Lead poisoning	1	1	**2**	Toxoplasmosis	0	0	**0**
Legionellosis	0	0	**0**	Trichinellosis	0	0	**0**
Leish, cutaneous	3	0	**3**	Trypanosomiasis, Afr.	0	0	**0**
Leish, mucocutaneous	0	0	**0**	Trypanosomiasis, Amer.	0	0	**0**
Leish, unspecified	0	0	**0**	Tuberculosis, pulminary	5	6	**11**
Leish, visceral	0	0	**0**	Tularemia	0	0	**0**
Leish, viscerotropic	0	0	**0**	Typhoid fever	0	0	**0**
Leprosy	0	0	**0**	Typhus fever	0	0	**0**
Leptospirosis	0	0	**0**	Urethritis, non-specific	246	189	**435**
Listeriosis	0	0	**0**	Vaccine advrs event	0	1	**1**
Lyme disease	4	9	**13**	Varicella,adult only	74	33	**107**
Lymphogranuloma Vnrm	0	0	**0**	Yellow fever	0	0	**0**
				Total	**3190**	**2429**	**5619**

* Based on date of onset.

Date of report: 7-Aug-98

FIGURE S1. Sentinel reportable diseases, United States Army*
Comparison of first six months of calendar year 1998 and 1997

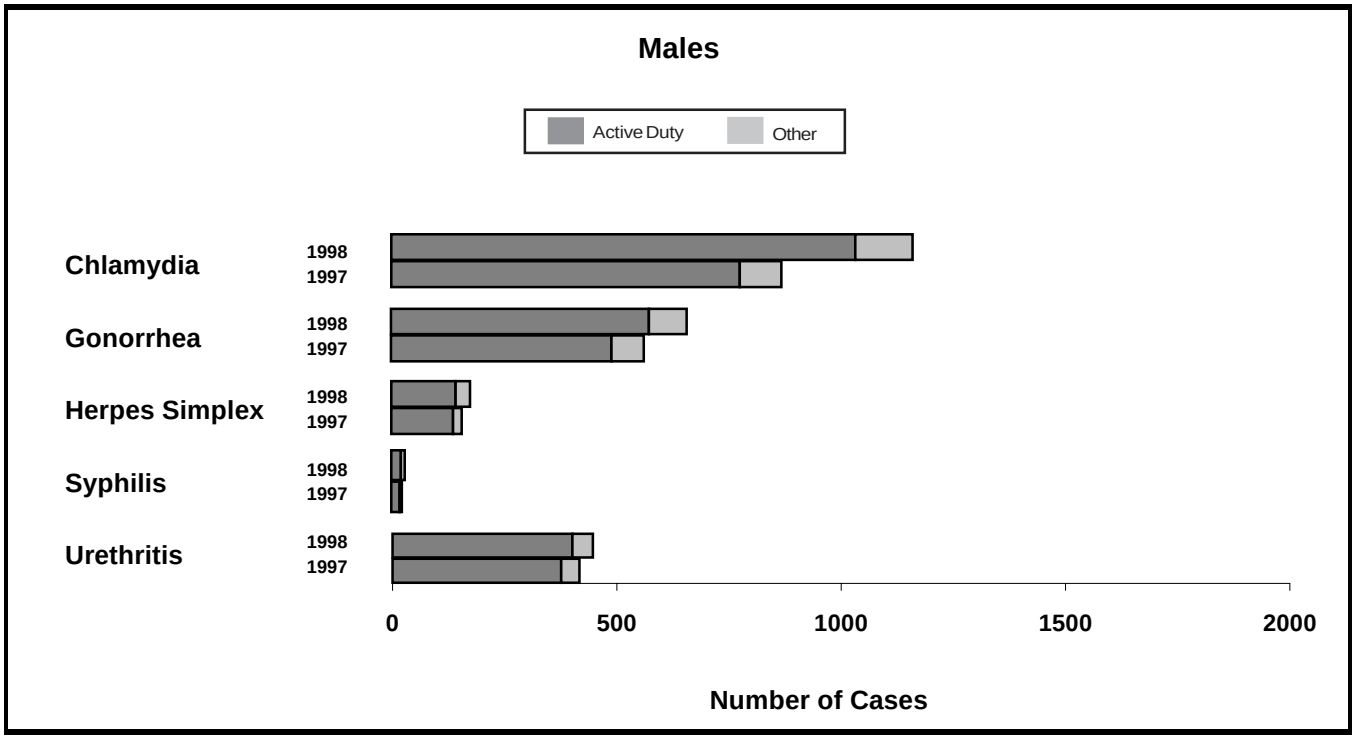


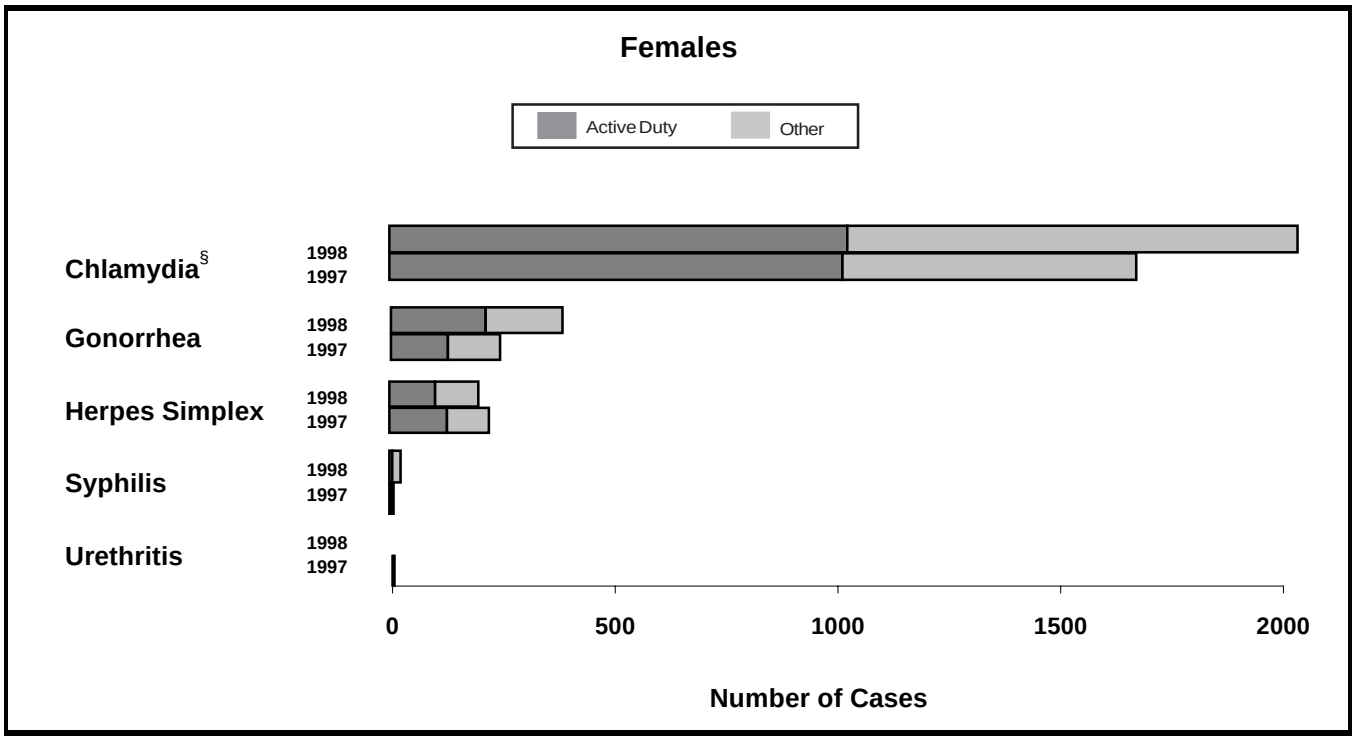
* Based on date of onset.

** Reports are included from main and satellite clinics. Not all sites reporting.

Date of Report: 7-Aug-98

FIGURE S2. Sentinel reportable STDs, United States Army*
Comparison of first six months, by gender, calendar years 1998 and 1997





* Based on date of onset.

** Reports are included from main and satellite clinics. Not all sites reporting.

§ Includes participants in a large-scale ongoing chlamydia study (females only).

Date of Report: 7-Aug-98

TABLE S2. Active duty force strength by MTF, United States Army, March, 1998*

MTF/Post**	Males							Females							All
	< 20	20-24	25-29	30-34	35-39	>= 40	Total M	< 20	20-24	25-29	30-34	35-39	>= 40	Total F	
NORTH ATLANTIC RMC															
Walter Reed AMC	208	1291	1340	1484	1732	3117	**9172**	41	388	552	510	467	580	**2538**	**11710**
Aberdeen Prov. Ground, MD	330	509	284	368	403	358	**2252**	56	107	84	68	48	40	**403**	**2655**
FT Belvoir, VA	24	240	302	330	304	395	**1595**	10	95	128	94	90	58	**475**	**2070**
FT Bragg, NC	1878	11611	8887	6242	4176	2446	**35240**	325	1600	1271	715	454	254	**4619**	**39859**
FT Drum, NY	679	3416	2347	1371	939	469	**9221**	99	463	248	145	85	44	**1084**	**10305**
FT Eustis, VA	435	1465	1211	976	895	800	**5782**	138	467	323	182	155	108	**1373**	**7155**
FT Knox, KY	1067	2340	1468	1362	1367	819	**8423**	49	215	170	145	93	79	**751**	**9174**
FT Lee, VA	450	878	729	641	463	388	**3549**	285	454	266	179	132	85	**1401**	**4950**
FT Meade, MD	96	733	1036	945	725	870	**4405**	56	283	317	210	186	165	**1217**	**5622**
West Point, NY	31	265	268	653	568	571	**2356**	9	69	59	115	86	67	**405**	**2761**
GREAT PLAINS RMC															
Brooke AMC	339	892	992	1019	802	912	**4956**	355	502	475	355	293	298	**2278**	**7234**
Wm Beaumont AMC	616	2480	1893	1339	1121	1078	**8527**	168	705	465	236	158	147	**1879**	**10406**
FT Carson, CO	840	4462	3312	2113	1572	771	**13070**	179	689	436	236	157	100	**1797**	**14867**
FT Hood, TX	2789	13224	8836	5542	3790	2281	**36462**	546	2373	1632	867	608	333	**6359**	**42821**
FT Huachuca, AZ	364	1021	977	762	670	442	**4236**	160	352	234	153	137	85	**1121**	**5357**
FT Leavenworth, KS	81	260	245	512	872	590	**2560**	34	105	70	78	93	51	**431**	**2991**
FT Leonard Wood, MO	770	1533	1107	1054	838	482	**5784**	272	422	282	164	100	56	**1296**	**7080**
FT Polk, LA	472	2556	1720	1257	787	400	**7192**	122	426	244	155	97	55	**1099**	**8291**
FT Riley, KS	827	3804	2233	1317	877	433	**9491**	115	484	260	159	87	62	**1167**	**10658**
FT Sill, OK	1403	4053	2595	1736	1353	802	**11942**	143	456	306	199	122	76	**1302**	**13244**
Panama	59	494	583	499	401	307	**2343**	12	73	86	45	25	19	**260**	**2603**
SOUTHEAST RMC															
Eisenhower AMC	1313	2039	1528	1193	1263	1164	**8500**	298	561	470	344	355	236	**2264**	**10764**
FT Benning, GA	2630	5375	3511	2173	1425	729	**15843**	149	513	393	222	156	75	**1508**	**17351**
FT Campbell, KY	1200	6972	5783	3469	2289	1139	**20852**	202	1037	718	416	247	105	**2725**	**23577**
FT Jackson, SC	1033	1403	844	963	713	463	**5419**	707	865	420	344	172	97	**2605**	**8024**
FT McClellan, AL	431	733	474	568	521	419	**3146**	226	290	163	112	94	56	**941**	**4087**
FT Rucker, AL	85	600	979	633	478	437	**3212**	60	197	131	62	56	33	**539**	**3751**
FT Stewart, GA	1320	6004	4310	2629	1845	998	**17106**	239	1048	739	363	241	122	**2752**	**19858**
WESTERN RMC															
Madigan AMC	1093	5040	3852	2622	1882	1270	**15759**	203	866	613	338	233	211	**2464**	**18223**
FT Irwin, CA	273	1313	901	751	529	281	**4048**	35	167	127	76	54	29	**488**	**4536**
FT Wainwright, AK	328	1952	1758	997	619	331	**5985**	50	315	255	142	111	57	**930**	**6915**
OTHER LOCATIONS															
Tripler AMC	595	4118	3481	2200	1565	970	**12929**	147	763	710	417	296	199	**2532**	**15461**
Europe	1676	11563	10982	7388	5419	3762	**40790**	382	2317	1926	1200	857	527	**7209**	**47999**
Korea	1937	8363	6094	4447	3286	2197	**26324**	442	1494	1116	669	525	296	**4542**	**30866**
Other/Unknown	1575	8696	8779	9202	6781	4514	**39547**	536	1850	1457	1110	909	487	**6349**	**46795§**
Total	**29247**	**121698**	**95641**	**70757**	**53270**	**37405**	**408018**	**6850**	**23011**	**17146**	**10825**	**7979**	**5292**	**71103**	**480020**

* Based on duty zip code. Does not account for TDY.

** Includes any subordinate catchment areas not listed separately.

§ Includes unknown age groups and unknown gender.

Source: Defense Manpower Data Center (DMDC)

DEPARTMENT OF THE ARMY
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